

Curzon Science Curriculum September 2020

Curzon specific aims of Science

Science is accessible to all and is related to everyday life and experiences where possible.

Children are curious and ask questions about what they see around them.

Children develop wonder about and respect for the world around them.

Science is explored through a range of activities at home

Children learn to plan and carry out their investigations, working collaboratively together and thinking like scientists.

How this links with our school vision: [growing in wisdom and developing curiosity and respect of the world around them.](#)

How the curriculum is tailored to our pupils- our implementation

We emphasise CC links between science and other subjects as this has led to improvements in both scientific knowledge and writing. The chart below shows some key cross curricular links.

We also make the most of our rich natural environment e.g. KS1 trees in different seasons, investigating school grounds for different types of rock. Foundation governor input into evolution reflects C of E nature of school. We are keen to promote diversity and teach children about scientists from different groups e.g. Mary Anning, female astronauts.

We plan carefully to ensure there is progression within each unit. E.g. Rocks Y3 -Start by feeling and observing rocks. Compare rocks-scratch test and porous/non porous. Then look at fossils. After rocks, we look at soil which is made from rock and other organic material.

Electricity Y6- Test to assess prior knowledge, recap key concepts e.g. circuit needs to be complete, circuit diagrams, insulators/conductors, apply this knowledge to making Christmas decorations.

Each unit starts with an opportunity for children to show their prior knowledge. This is then added to during the unit.

Key areas that we feel are important for our Curzon children are: scientific vocabulary, emphasis on working accurately and building on scientific investigations with exploration at home in KS2. Observations of our pupils shows that they often find it difficult to express themselves scientifically and lack skills in taking accurate measurements. To support the development of this there are vocabulary banks at the start of each unit which are then kept live and referred to during the unit. Within units, accurate recording of measurements is modelled and children are taught to use different equipment to do this. Older children are taught the importance of taking 3 measurements and reflecting on these to identify inaccuracies.

Our children can be quite sedentary at home and we are keen for them to try out practical activities at home. To promote enthusiasm in science, we hold special event days. Following on from these, children are given the chance to recreate some of the experiments at home. The use of big questions in RE has been successful in motivating children and stimulating deeper thinking. This is now being used in Science.

Unit	Year	Cross-curricular links
Seasonal changes		Art- seasonal pictures Geography- walk in local area
Plants	Year 1,2,3	Art – Recreating plants and the key features, either through sketching or modelling Geography – Physical geography including biomes and vegetation belts, locating plants by their countries or regions-links to Rainforest topic. English – Writing an information text about plants and flowers. Persuasive writing, save the rainforest plants.
Animals, including humans	Year 1,2 ,3, 4, 5 and 6	Maths – Percentages/ fractions for nutrition, data handling PSHE – SRE – Reproduction, changes through age phases

		<p>History – Stone Age to Iron Age, Ancient Greece, changes in medicine and medical understanding</p> <p>P.E – Fitness tests, use of muscles, heart rate/ pulse and how this is affected by exercise</p>
Rocks	Year 3	<p>Geography – Physical geography, location of particular rock formations</p> <p>Literacy – Stone Age Boy</p> <p>History – Stone Age Britain - uses of rocks/types of rocks used and suitability for job. Flint trade (Icknield Way – local history)</p>
Light	Year 3 and 6	<p>Maths – Data and statistics, change in shape, size, direction of shadows over time; change in size of shadow depending on closeness to light source.</p> <p>Art – Recreating images of light through sketching or modelling, spectrums of colour</p> <p>Geography – Time zones</p> <p>DT- creating Christmas decorations</p>
Forces and magnets	Year 3 and 5	<p>DT – Pulleys and gears, weight-bearing structures, how to stiffen and strengthen complex structures</p> <p>Maths – Data handling, Measurements, Percentages/ fractions of change</p> <p>Geography – Poles of the earth, physical geography</p>
Living Things and their Habitats	Year 1, 2, 4, 5 and 6	<p>English –fact files, creating questions</p> <p>Maths – Data handling including using different diagrams to record and sort information</p> <p>Geography – Human and physical geography, Biomes, Tropics and Equator, locating living species</p> <p>PSHE – SRE - Reproduction</p>

States of Matter	Year 4	<p>Maths – Measuring changes in temperatures</p> <p>Geography – The water cycle, Rivers</p> <p>Design Technology – Design project based around a particular brief, Food and change in state through temperature- cookery unit.</p>
Sound	Year 4	<p>Music - identify sounds with increasing aural memory (focus on instruments). Matching sounds in simple, class-made shakers, according to the contents.</p> <p>Maths- Measuring how far away a drum can be heard (go onto the playing field).</p>
Electricity	Year 4 and 6	<p>Design Technology – Creating an electrical circuit game such as a buzz wire game, designs using particular materials as insulators or conductors</p> <p>English – Information texts, biographical writing about famous scientists</p> <p>Geography – Y4 natural disasters lightning</p> <p>PSHE – Keeping safe</p>
Properties and Changes of Materials	Year 1,2,5	<p>Maths - Data handling, Measurements, Percentages/ fractions of change</p> <p>Design Technology – cookery unit, textiles and design ideas, structures and materials used Creating houses/ umbrellas out of different materials.</p>
Earth and Space	Year 5	<p>Art – Create/recreate images of Earth or space and the key features, either through sketching or modelling</p> <p>Maths – Time including calendars</p> <p>History – Ancient Greece</p>
Evolution and Inheritance	Year 6	<p>RE- Genesis</p> <p>English – Information text about a species of animal, newspaper report, Mary Anning biography</p>

		History – How the human species has changed
Working scientifically	Year 3-6	<p>Maths – Data handling and statistics, Measurements, Percentages and fractional changes, decimals, calculating</p> <p>English – Writing reports, creating questions</p> <p>P.E – How the body works including changes during exercise</p> <p>PSHCE – Keeping safe</p> <p>History - How what we know has changed over history, how scientists have built up on previous work</p>

Curzon Long Term Curriculum Planning for Science

We have mapped out the skills needed to be a scientist. Pupils will need to be explicitly taught these skills within the context of the units, building up disciplinary knowledge of how scientific knowledge is generated.

EYFS science is taught mainly through continuous provision covering the following key skills and following the same broad units at KS1:

Explore the natural world around them, making observations and drawing pictures of animals and plants;

Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class

Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

Our EYFS science curriculum also provides rich opportunities for children to develop skills in other areas e.g. listening and attention; speaking; self-regulation - working with others and turn taking; managing self (confidence, self-resilience and perseverance); gross motor skills (negotiating space in the outside environment and woods); fine motors skills (especially drawing skills); Literacy and maths skills (especially counting and subitising)

KS1-2

We follow the order of the 2014 National Curriculum whereby units build on each other e.g. light is taught in Y3 where children investigate and learn about shadows and then in Y6 where they extend this knowledge to how light travels.

Science in KS1 is taught on a two year rolling programme. Topics are the same both Year 1 and Year 2 but taught at a different level depending on the year group. We use mixed aged planning from Hamilton to ensure continuity and progression.

YEAR A

Autumn	Spring	Summer	Skills KS1
<p>Animals, including humans – Amazing me! notice that animals, including humans, have offspring which grow into adults find out about and describe the basic needs of animals, including humans, for survival (water, food and air) describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene label parts of body senses</p> <p>Seasonal Changes-Wild Weather observe changes across the 4 seasons observe and describe weather associated with the seasons and how day length varies shadows make a rainfall gauge wind direction measure temperature</p>	<p>Materials – Brilliant Builders distinguish between an object and the material from which it is made identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock describe the simple physical properties of a variety of everyday materials compare and group together a variety of everyday materials on the basis of their simple physical properties identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses (2EM). Three Little Pigs</p> <p>Plants – Growing Things identify and name a variety of common wild and garden plants, including deciduous and evergreen trees grow potatoes, beans, cress</p>	<p>Animals- Wild and Wonderful Creatures identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals identify and name a variety of common animals that are carnivores, herbivores and omnivores describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense notice that animals, including humans, have offspring which grow into adults create a habitat in a bottle create a tray safari</p> <p>Living things – Food Chains identify and name a variety of plants and animals in their habitats, including microhabitats</p>	<p>Thinking like a scientist ask simple questions about the world make observations using senses carry out simple tests to help answer questions use senses to compare objects, materials and living things sort objects into groups explain how they have sorted objects into groups</p> <p>Experimenting like a scientist gather evidence to help answer question record simple data to help answer questions observe how things change over time use equipment to make measurements</p> <p>Finding answers like a scientist identify patterns in results describe how some people use science in their jobs describe and explain what they have found out</p>

		<p>describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food</p> <p>explore and compare the differences between things that are living, dead, and things that have never been alive</p> <p>identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other.</p>	<p>explain how they found things out</p> <p>use evidence from observations to suggest answers to questions</p>
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YEAR B

Autumn	Spring	Summer	Skills KS1
<p>Animals – People and Pets</p> <p>find out about and describe the basic needs of animals, including humans, for survival (water, food and air)</p> <p>describe the importance for humans of exercise, eating the right amounts</p>	<p>Materials – Brilliant Builders</p> <p>describe the simple physical properties of a variety of everyday materials</p> <p>compare and group together a variety of everyday materials on the basis of their simple physical properties</p>	<p>Materials - Exploring Changes</p> <p>identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock</p> <p>describe the simple physical properties of a variety of everyday materials</p>	<p>Thinking like a scientist</p> <p>ask simple questions about the world</p> <p>make observations using senses</p> <p>carry out simple tests to help answer questions</p> <p>use senses to compare objects, materials and living things</p>

<p>of different types of food, and hygiene identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals identify and name a variety of common animals that are carnivores, herbivores and omnivores</p> <p>investigate wood lice design an imaginary pet</p> <p>Seasonal Changes- Weather Art observe changes across the 4 seasons observe and describe weather associated with the seasons and how day length varies make a wind sock, wind spinner investigate light sources create a sundial</p>	<p>identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching umbrellas absorbency and waterproofness</p> <p>Plants Art and Nature identify and name a variety of common wild and garden plants, including deciduous and evergreen trees identify and describe the basic structure of a variety of common flowering plants, including trees observe and describe how seeds and bulbs grow into mature plants find out and describe how plants need water, light and a suitable temperature to grow and stay healthy seed dispersal investigate inside of a flower leaf and bark rubbings</p>	<p>compare and group together a variety of everyday materials on the basis of their simple physical properties identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching investigate ice, puddles create a wax resist picture</p> <p>Living things – Habitats and Homes explore and compare the differences between things that are living, dead, and things that have never been alive. identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other create a bug hotel</p>	<p>sort objects into groups explain how they have sorted objects into groups</p> <p>Experimenting like a scientist gather evidence to help answer question record simple data to help answer questions observe how things change over time use equipment to make measurements</p> <p>Finding answers like a scientist identify patterns in results describe how some people use science in their jobs describe and explain what they have found out explain how they found things out use evidence from observations to suggest answers to questions</p>
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Long Term Curriculum Planning for Science: Year 3

Autumn	Spring	Summer	Skills Lower KS2
<p>Rocks compare and group together different kinds of rocks on the basis of their appearance and simple physical properties describe in simple terms how fossils are formed when things that have lived are trapped within rock recognise that soils are made from rocks and organic matter observe rocks using magnifying glasses and microscope test rocks for their permeability know about Mary Anning</p> <p>Forces & Magnets compare how things move on different surfaces notice that magnetic forces can act at a distance observe how magnets attract or repel each other and attract some materials and not others</p>	<p>Animals including humans (nutrition and skeletons) identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat identify that humans and some other animals have skeletons and muscles for support, protection and movement types of skeletons joints</p> <p>Light recognise that they need light in order to see things and that dark is the absence of light notice that light is reflected from surfaces design reflector for book bag</p>	<p>Plants identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant investigate the way in which water is transported within plants explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal</p> <p>Practice and consolidation time</p>	<p>Thinking like a scientist ask appropriate scientific questions about the world use scientific knowledge to sort and classify objects, materials and living things suggest how to make a simple comparative test fair suggest how to investigate patterns they have observed plan an appropriate scientific investigation select appropriate equipment to use during my investigation suggest what data should be collected in an investigation suggest how to collect data in an investigation</p> <p>Experimenting like a scientist carry out simple scientific experiments use simple practical tests to compare things</p>

<p>compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials</p> <p>describe magnets as having 2 poles</p> <p>predict whether 2 magnets will attract or repel each other, depending on which poles are facing</p> <p>sort materials</p> <p>carry out fair tests</p> <p>investigate friction</p> <p>create own magnetic game</p>	<p>recognise that light from the sun can be dangerous and that there are ways to protect their eyes</p> <p>recognise that shadows are formed when the light from a light source is blocked by an opaque object</p> <p>find patterns in the way that the size of shadows change</p>		<p>make systematic and careful observations</p> <p>use equipment to take accurate measurements</p> <p>measure and record using standard units</p> <p>use simple scientific language to record my findings</p> <p>use drawings and labelled diagrams to help explain investigations</p> <p>use tables to record the results of my investigations</p> <p>use a key for identification</p> <p>Finding answers like a scientist</p> <p>describe results of investigations</p> <p>present the findings using a bar chart</p> <p>present conclusions in a range of formats</p> <p>use scientific knowledge to explain the results of investigations and write a simple conclusion</p> <p>use conclusions from investigations to make simple predictions</p> <p>use scientific evidence to support conclusions</p> <p>use sources of information to try to answer questions that cannot be investigated</p>
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			describe the research and discoveries of famous scientists linked to my investigations
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Long Term Curriculum Planning for Science: Year 4

Autumn	Spring	Summer	Skills Lower KS2
<p>Animals including humans (digestion, teeth) describe the simple functions of the basic parts of the digestive system in humans identify the different types of teeth in humans and their simple functions construct and interpret a variety of food chains, identifying producers, predators and prey teeth investigation-acids understand how to care for our teeth</p> <p>Electricity</p>	<p>Sound identify how sounds are made, associating some of them with something vibrating recognise that vibrations from sounds travel through a medium to the ear find patterns between the pitch of a sound and features of the object that produced it find patterns between the volume of a sound and the strength of the vibrations that produced it</p>	<p>States of matter compare and group materials together, according to whether they are solids, liquids or gases observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</p>	<p>Thinking like a scientist ask appropriate scientific questions about the world use scientific knowledge to sort and classify objects, materials and living things suggest how to make a simple comparative test fair suggest how to investigate patterns they have observed plan an appropriate scientific investigation select appropriate equipment to use during my investigation</p>

<p>identify common appliances that run on electricity</p> <p>construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers</p> <p>identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery</p> <p>recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</p> <p>recognise some common conductors and insulators, and associate metals with being good conductors</p> <p>construct simple series circuits</p>	<p>recognise that sounds get fainter as the distance from the sound source increases</p> <p>create instruments</p> <p>Living things & their habitats</p> <p>recognise that living things can be grouped in a variety of ways</p> <p>explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</p> <p>recognise that environments can change and that this can sometimes pose dangers to living things</p>	<p>Practice and consolidation time</p>	<p>suggest what data should be collected in an investigation</p> <p>suggest how to collect data in an investigation</p> <p>Experimenting like a scientist</p> <p>carry out simple scientific experiments</p> <p>use simple practical tests to compare things</p> <p>make systematic and careful observations</p> <p>use equipment to take accurate measurements</p> <p>measure and record using standard units</p> <p>use simple scientific language to record my findings</p> <p>use drawings and labelled diagrams to help explain investigations</p> <p>use tables to record the results of my investigations</p> <p>use a key for identification</p> <p>Finding answers like a scientist</p> <p>describe results of investigations</p> <p>present the findings using a bar chart</p> <p>present conclusions in a range of formats</p> <p>use scientific knowledge to explain the results of</p>
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			investigations and write a simple conclusion use conclusions from investigations to make simple predictions use scientific evidence to support conclusions use sources of information to try to answer questions that cannot be investigated describe the research and discoveries of famous scientists linked to my investigations
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Long Term Curriculum Planning for Science: Year 5

Autumn	Spring	Summer	Skills upper KS2
Earth and Space describe the movement of the Earth and other planets relative to the sun in the solar system describe the movement of the moon relative to the Earth describe the sun, Earth and moon as approximately spherical bodies use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky	Forces explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object identify the effects of air resistance, water resistance and friction, that act between moving surfaces recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect	Animals including humans (human development) describe the changes as humans develop to old age Living things & their habitats (life cycles) describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird	Thinking like a scientist Use scientific experiences to raise different kinds of questions select and plan the most appropriate type of scientific enquiry to answer a question recognise how and when to set up comparative and fair test and explain which variables need to be controlled select the most appropriate equipment to take accurate

<p>Properties and changes of materials compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic demonstrate that dissolving, mixing and changes of state are reversible changes explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda</p>	<p>Practice and consolidation time</p>	<p>describe the life process of reproduction in some plants and animals</p>	<p>measurements and explain how to use the equipment</p> <p>Experimenting like a scientist measure and record accurate and precise results using a range of scientific equipment design own results tables to record results tables from a range of investigations select which observations to make, what measurements to use and how long to make them for recognise when it is appropriate to take repeat readings and know how to calculate average results</p> <p>produce own keys to help with classification and identification</p> <p>Finding answers like a scientist describe how famous scientists developed their ideas based on observation and experiment present the findings of investigations using scatter graphs and line graphs describe the results of my investigations, identifying different casual relationships in data</p>
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			<p>use evidence to produce a conclusion, using scientific knowledge to explain results</p> <p>use evidence to refute or support a scientific idea</p> <p>recognise when further tests and observations may need to be collected to reach a conclusion</p> <p>select appropriate secondary sources to research ideas</p> <p>suggest improvements to an investigation</p> <p>use relevant scientific language to communicate and justify scientific ideas</p> <p>explain how scientific ideas have changed over time</p>
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Long Term Curriculum Planning for Science: Year 6

Autumn	Spring	Summer	Skills upper KS2
<p>Light</p> <p>recognise that light appears to travel in straight lines</p> <p>use the idea that light travels in straight lines to explain that objects</p>	<p>Living things and their habitats</p> <p>describe how living things are classified into broad groups according to common observable characteristics and based on similarities and</p>	<p>Animals including humans (circulatory system)</p> <p>identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood</p>	<p>Thinking like a scientist</p> <p>Use scientific experiences to raise different kinds of questions</p> <p>select and plan the most appropriate type of scientific enquiry to answer a question</p>

<p>are seen because they give out or reflect light into the eye explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them</p> <p style="text-align: center;">Electricity</p> <p>associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches use recognised symbols when representing a simple circuit in a diagram create a light up Christmas decoration</p>	<p>differences, including micro-organisms, plants and animals give reasons for classifying plants and animals based on specific characteristics</p> <p style="text-align: center;">Evolution and Inheritance</p> <p>recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution discussion and debate with members of foundation Govs</p>	<p>recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function describe the ways in which nutrients and water are transported within animals, including humans</p> <p>Practice and consolidation time</p>	<p>recognise how and when to set up comparative and fair test and explain which variables need to be controlled select the most appropriate equipment to take accurate measurements and explain how to use the equipment</p> <p style="text-align: center;">Experimenting like a scientist</p> <p>measure and record accurate and precise results using a range of scientific equipment design own results tables to record results tables from a range of investigations select which observations to make, what measurements to use and how long to make them for recognise when it is appropriate to take repeat readings and know how to calculate average results</p> <p>produce own keys to help with classification and identification</p> <p style="text-align: center;">Finding answers like a scientist</p> <p>describe how famous scientists developed their ideas based on observation and experiment</p>
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			<p>present the findings of investigations using scatter graphs and line graphs</p> <p>describe the results of my investigations, identifying different casual relationships in data</p> <p>use evidence to produce a conclusion, using scientific knowledge to explain results</p> <p>use evidence to refute or support a scientific idea</p> <p>recognise when further tests and observations may need to be collected to reach a conclusion</p> <p>select appropriate secondary sources to research ideas</p> <p>suggest improvements to an investigation</p> <p>use relevant scientific language to communicate and justify scientific ideas</p> <p>explain how scientific ideas have changed over time</p>
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Impact

Pupil voice shows that children enjoy science and are well motivated in this subject. End of term Target Tracker assessments shows that pupils' attainment in science is at least in line with attainment in core subjects in all year groups. Some SEN pupils who struggle with writing, attain better in science than in literacy.

By the time our pupils leave Curzon they will:

- Show an understanding of the importance of our local eco systems and environment
- Develop sound enquiry skills to plan, carry out and evaluate investigations
- Use a rich vocabulary to articulate their understanding of concepts
- Understand how science is important to many jobs and have high aspirations of themselves
- Possess the knowledge and skills needed for KS3 curriculum